QUALITY ASSURANCE PROJECT PLAN FOR THE DETERMINATION OF POLYCHLORINATED DIBENZO-P-DIOXINS AND DIBENZOFURANS IN Redacted

COMPANY SANITIZED

Data Requirement:

Dioxin/Furan Test Rule, 40 CFR § 766

QAPP Guidance Document:

"Guidelines for the Determination of Halogenated Dibenzo-p-dioxins and Dibenzofurans in Commercial Products, Appendix B"

Prepared For:

Albaugh, Inc
121 N.E. 18th Street
Ankeny, IA 50021

Prepared By:

Mark R. Bauer, Ph.D.

MARCH 2000

TABLE OF CONTENTS

3.0 PROJECT DESCRIPTION AND ORGANIZATION

In order to satisfy requirements for testing chemical substances that may be contaminated with halogenated dibenzo-p-dioxins and dibenzofurans as defined in Section 4 of U.S. Environmental Protection Agency (EPA) Toxic Substance Control Act (TSCA), 15 USC 2603 and 40 CFR § 766.3 and requirements for reporting under Section 8 of TSCA, 15 USC 2607, Albaugh Inc. has contracted with Battelle to perform the dioxin/furan testing following 40 CFR part 766 on redacted.

Redacted (redacted, CAS No. redacted) imported by Albaugh, Inc. will be sampled at their toll manufacturing plant where redacted is used in the production of Albaugh's commercial product. The samples will be sent to Battelle to be analyzed for polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/PCDF).

Sampling will be conducted in accordance with the sampling protocol entitled "Sampling Protocol for the Determination of Polychlorinated Dibenzo-p-dioxins and Dibenzofurans in Redacted". Redacted manufactured by Anupam Rasayan, 1661, Suthar Street, Nanpura, Surat – 395001, India will be sampled for analysis. Randomly selected barrels from seven different batches of redacted will be sampled at Albaugh's toll manufacturing plant; Blackman Uhler Chemical, 1010 Glass Factory Avenue, Augusta, GA 30903.

The samples will be sent to Battelle, 505 King Ave., Columbus, OH 43201 for analysis. The samples will be analyzed in accordance with the analytical protocol entitled "Analytical Protocol for the Determination of Polychlorinated Dibenzo-p-dioxins and Dibenzofurans in Redacted". The analytical method outlined in the analysis protocol is designed to meet regulatory requirements promulgated by the U.S. Environmental Protection Agency, Dioxin/Furan Test Rule, 40 CFR 766.

PCDD/PCDF analytes will be quantitated at or below the following target levels of quantitation (LOQs):

Chlorinated Dioxins	LOQs
2,3,7,8-TetraCDD	0.1 ppb*
1,2,3,7,8-PentaCDD	0.5 ppb
1,2,3,4,7,8-HexaCDD	2.5 ppb
1,2,3,6,7,8-HexaCDD	2.5 ppb
1,2,3,7,8,9-HexaCDD	2.5 ppm
1,2,3,4,6,7,8-HeptaCDD	100 ppb

Chlorinated Furans	LOQs
2,3,7,8-TetraCDF	1 ppb
1,2,3,7,8-PentaCDF	5 ppb
1,2,3,7,8-PentaCDF	5 ppb
1,2,3,4,7,8-HexaCDF	25 ppb
1,2,3,4,7,8-HexaCDF	25 ppb
1,2,3,7,8,9-HexaCDF	25 ppb
2,3,4,6,7,8-HexaCDF	25 ppb
1,2,3,4,6,7,8-HeptaCDF	1000 ppb
1,2,3,4,7,8,9-HeptaCDF	1000 ppb

* ppb = part per billion or ng/g

Seven redacted samples will be analyzed. Quality control steps will be taken to ensure the quality of the data. One of the seven product samples will be randomly selected and analyzed in duplicate. One of the seven product samples will be randomly selected and analyzed both spiked and unspiked with target PCDD/PCDF analytes. These samples will demonstrate the test rule requirements for method sensitivity and precision can be met. A laboratory method blank will also be analyzed with the seven product samples to demonstrate the absence of PCDD/PCDF or non-PCDD/PCDF interferences.

The seven test samples and the quality assurance samples (duplicate, matrix spike, and laboratory method blank) will constitute the sample set. All ten samples will be processed together for a valid demonstration of the quality of the test data.

Each sample will be spiked with isotopically labeled PCDD/PCDF used as internal standards. Possible PCDD/PCDF will be extracted and the extracts cleaned up using several chromatography columns. PCDD/PCDF determination will be performed using Gas Chromatography/Mass Spectrometry in the Selected Ion Monitoring mode (SIM-GC/MS).

The analytical data will be collected, processed, and reported as described in this document.

4.0 MANAGEMENT AND PERSONNEL QUALIFICATIONS

Ron Collins, the Study Director for the sampling protocol, is the Product Development Manager at Albaugh's formulation and packaging facility. Ron Collins reports to Jim Kahnk, Operations Manager for Albaugh. John Stadalsky, the Quality Assurance Officer for sampling, is the Chief Chemist at Blackman Uhler manufacturing plant and

manages the plant's Quality Control Department. The sampling will be conducted by a chemist in the Quality Control Department. John Stadalsky reports to Jeter Starnes, Blackman Uhler's Vice President of Research and Development

Mark Bauer, the Study Director for the analytical protocol, is the Technical Leader for Product Characterization in Battelle's AgriFood Market Sector. Mark reports to Cora Steginsky, AgriFood Market Sector Vice President and General Manager. The analyses will be conducted by staff in Battelle's Atmospheric Sciences and Applied Technology Department. The samples will be prepared for analyses by Mark Misita and Andrew Savage. The prepared samples will be analyzed by Joe Tabor. All the analytical work will be conducted in a laboratory dedicated to dioxin analyses. Chuck Lawrie, the Quality Assurance Officer, serves as the Quality Assurance Manager for both the AgriFood and the Atmospheric Sciences and Applied Technology groups. Mark Misita, Andrew Savage, Joe Tabor, and Charles Lawrie report to Karen Riggs, Deputy Manager for the Atmospheric Sciences and Applied Technology Department.

A reporting structure block diagram is shown in Figure 1. Curriculum vitae for the sampling Study Director and Quality Assurance Officer are provided in Appendix A. Curriculum vitae for the analysis Study Director and Quality Assurance Officer are also provided in Appendix A.

5.0 ANALYSIS FACILITIES, EQUIPMENT, AND SERVICES

5.1 Facilities

Any work related to PCDD/PCDF determination including the preparation, handling, and storage of all samples and standards is conducted within a laboratory dedicated to dioxin/furan analysis. The dioxin/furan laboratory has extensive experience in the field of trace environmental analysis. The laboratory has been determining dioxins and related compounds since the early 1970s. The laboratory has conducted many studies in response to the EPA regulations for testing certain chemicals for dioxins and furans under TSCA (40 CFR 766, 52 FR 21437, June 5, 1987). All submitted studies have been considered as acceptable by EPA.

5.2 Inspections and Maintenance

Written standard operating procedures regarding methods, materials, and schedules to be used for the routine inspection, cleaning, maintenance, testing, calibration, and standardization of equipment are maintained in the laboratory. Written records are maintained of all operations.

Examples of routine operations:

certification of balances: every 12 months;

calibration of thermometers: every 12 months;

inspection of GC/MS instrument: daily, maintenance every 12 months or on instrument demand;

qualification of GC/MS data system: every 12 months or on software or hardware upgrades

inspection of glassware cleanliness: a blank is run through the entire analytical procedure with every set of samples.

5.3 Calibration Procedures

The performance of the GC/MS system is checked following the procedures detailed in laboratory standard operating procedures. The instrument calibration method is similar to that proscribed by EPA Method 1613.

On a daily basis, aliquots of the calibration solutions containing native and isotopically labeled PCDD/PCDF compounds are analyzed to demonstrate adequate sensitivity, response factor reproducibility (±20% for native analytes and ±35% for ^{13}C-labeled compounds), mass range calibration, and column performance. If the required criteria are not met, corrective actions, such as instrument re-tuning, re-analysis of the calibration solution, or generation of a new initial calibration curve, must be taken before samples are analyzed.

5.4 Calibration Materials

Standard compounds used in this study are obtained from Cambridge Isotopes Laboratories, Inc. (CIL), Woburn, MA, USA.

6.0 DATA GENERATION

6.1 Sample Collection

The sample collection is described in the GLP sampling protocol. The protocol details how the samples will be randomly selected, generated, and handled. Sampling methods are based those presented in "Guidelines for the Determination of Polyhalogenated Dibenzo-p-dioxins Dibenzofurans in Commercial Products, Appendix C". The protocol also includes procedures for shipping the samples to the analytical laboratory.

6.2 Sample Custody

A chain-of-custody (COC) document will be generated by the sampling team. The COC will travel with samples and will document who has control of the samples and the condition of the samples before and after all transfers of control. The samples arriving in the analytical laboratory are checked for being properly labeled and packed. Upon receipt, the samples are recorded into the sample receipt logbook and all accompanying shipping records are saved in the study file. A unique laboratory sample-identification number is assigned to each sample and consistently recorded by the analyst on every container used during the course of the sample preparation and analysis.

After the analyses have been completed, the samples will be returned to Albaugh, Inc. for archive.

6.3 Laboratory Analysis Procedures

The sample analysis is described in the GLP analysis protocol. The analysis protocol details how the samples will be extracted, cleaned up, and analyzed. Analytical test methods are based those presented in "Guidelines for the Determination of Polyhalogenated Dibenzo-p-dioxins Dibenzofurans in Commercial Products", EPA Method 8290, and EPA Method 1613. The protocol includes a description of instrumental calibration procedures, how analytes are identified, equations used to calculate results, and Quality Assurance Requirements.

6.4 Quality Control Checks

Quality Control checks are performed to monitor glassware, instrument, and analysis performance. Analysis performance data are obtained by use of blank samples, spiked samples, and repeated measurements. Method blanks, duplicates, and spiked samples are included in every set of samples. All quality-check data are included with the study results.

6.5 Performance and System Audits

During testing for submission to EPA, the laboratory adheres to Good Laboratory Practices (GLPs). Qualified independent Quality Assurance Specialists are responsible for monitoring each study to assure conformance to regulations, protocols, and appropriate SOPs. Records pertaining to the study will be archived by the testing facility Quality Assurance Unit for a period of at least 10 years following the date on which the results are submitted to EPA. This includes, but is not limited to, all raw data, protocols, reports, and other documentation.

7.0 DATA PROCESSING

7.1 Collection of GC/MS Data

The GC/MS instrument is interfaced to a validated computer system that allows continuous acquisition and storage of the analytical data obtained throughout the duration of the chromatographic programs.

7.2 Data Reduction and Verification

Data reduction is accomplished using a validated software program designed for dioxin/furan analysis by the mass spectrometer manufacturer. The criteria applied for PCDD/PCDF identification and quantitation methods used are the same as those specified by the analysis protocol. Details of quantitative calibration procedures and the relevant equations for performing mathematical calculations are given in the analytical protocol. Any additional statistical calculations required, specific to this study, will be accomplished with a spreadsheet program.

Data review procedures include computerized and manual checks. The computer data system flags analysis results outside preset acceptance criteria. Calculations

will be checked from the raw data to the final value reported. Prior to review by the Quality Assurance Unit, the data will be manually reviewed by a second analyst who will verify that data reduction has been performed correctly and that the analytical results correspond to the data acquired and processed.

7.3 Storage

SIM-GC/MS raw data are stored on magnetic hard disks; hard copies of processed chromatograms and derived data are produced and saved separately.

8.0 DATA QUALITY ASSURANCE

Prior to sample cleanup, internal standards are added to every sample in order to provide an indication of the method performance with every sample analysis. Quality control steps are taken to ensure the quality of the data. These include the analysis of a laboratory method blank, a sample analyzed in duplicate, and a sample run spiked with native PCDD/PCDF compounds along with the product samples.

8.1 Laboratory Method Blank

Solvents, reagents, glassware, and other sample processing hardware may yield discrete artifacts or elevated baselines that interfere with interpretation of the analytical data. Analysis of the laboratory method blank demonstrates the absence of interference from these sources. To that effect, all steps detailed in the analytical procedure using all reagents, standards, equipment, apparatus, glassware, and solvents that are used for a sample analysis (omitting the product sample) are performed. The laboratory method blank contains the same amount of $^{13}C_{12}$-labeled internal standards that is added to each sample before extraction.

An acceptable method blank exhibits no positive response (i.e., no response for specific analytes that exceeds the target analytical method LOQ). If the method blank that is extracted along with a batch of samples is contaminated by PCDD/PCDF compounds, all positive samples from that batch must be rerun if they are positive for the same analyte(s) for which the blank is positive.

8.2 Precision

The test rule requirement for duplicate data is fulfilled by analysis of the duplicate samples which both contain the isotopically labeled PCDD/PCDF compounds used as internal standards. The duplicates must agree within 20%.

If the relative percent difference between recoveries is greater than 20 for anyone of the internal standards, the laboratory will attempt to identify the cause of the problem and repeat the analysis of the duplicates.

8.3 Accuracy

Labeled PCDD/PCDF compounds are added to very sample before the extraction to quantify the indigenous analyte present in the samples as well as to determine the overall method efficiency. For each set of samples, one portion of redacted sample is additionally spiked with a mixture of native PCDDs and PCDFs.

The recovery of the native PCDD/PCDF homologs are calculated by comparing the spiked and unspiked sample runs. Recovery of the native PCDDs and PCDFs must be in the range of 50 to 150%.

Satisfactory recoveries of the internal standards from the laboratory method blank must be verified. If interferences are encountered that cause recoveries of the internal standards in the blank to be greater than 150% or if the recoveries are less than 50%, the cause should be identified and appropriate procedural changes performed.

For each sample, the recovery of the internal standards must be in the range 50 to 150%.

The samples not meeting the 50 to 150% criterion need to be reanalyzed.

8.4 Completeness

100% of the samples taken are analyzed. The objective of completeness is 100% calculated as 100 x number of values recovered / number of recoverable values.

8.5 Comparability

On various occasions, the dioxin/furan laboratory has successfully participated and participates in national or international multilaboratory dioxin studies including the study that verified the concentrations of the analytical standards sold by Cambridge Isotope Laboratories.

9.0 CORRECTIVE ACTION

Corrective actions are measures taken to rectify conditions adverse to quality and, where possible, prevent their reoccurrence. During the analyses, any corrective actions taken, not described in the protocols or in the Quality Assurance Project Plan, will be explained in the study records. The occurrence of the problem, the corrective action employed, and verification that the problem has been eliminated will be included in the explanation.

10.0 DOCUMENTATION AND REPORTING

This study will be conducted in compliance with TSCA Good Laboratory Practice Standards (40 CFR 792). All records and data generated during the conduct of the study will be generated in accordance with this standard.

The final report will be prepared following the guidelines set forth in "Guidelines for Reporting Test Results of HDD and HDF Determinations in commercial products (40 CFR parts 707 and 766)". The report will include all required GLP elements set forth in 40 CFR 792.185. The report will include appendices containing at least:

- A final sampling report, prepared by the sampling Study Director, containing a GLP compliance statement, and all sampling records;
- Sample chain-of-custody records
- Standard preparation records
- Sample extraction and clean up records
- All GC/MS data for instrument calibrations and sample analyses

The final report is audited by the Quality Assurance Unit and submitted to sponsors.

11.0 REFERENCES

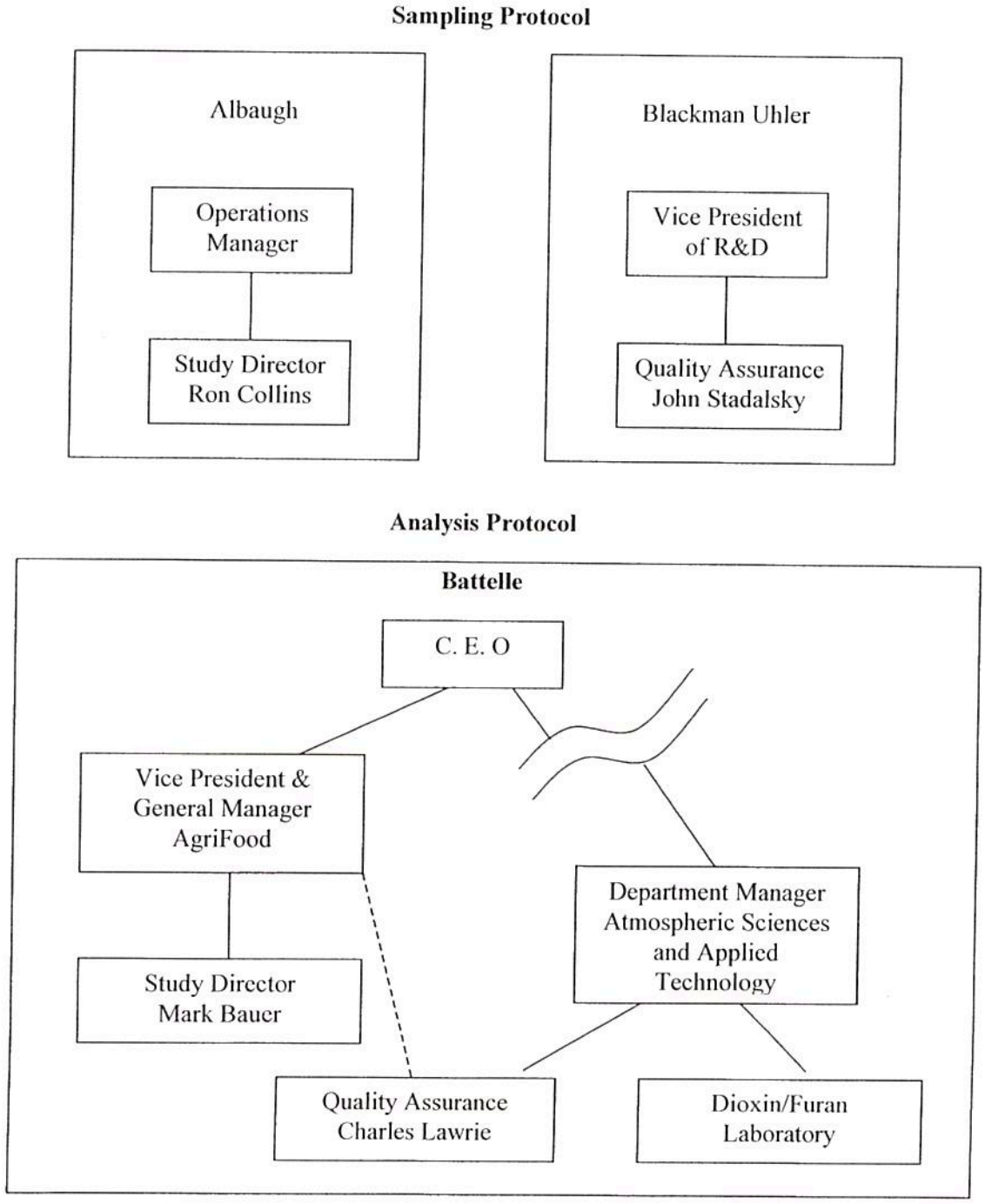
1) "Guidelines for the Determination of Halogenated Dibenzo-p-dioxins and Dibenzofurans in Commercial Products, Appendix B: Quality Assurance Project Plan for Measurement of Halogenated Dibenzo-p-dioxins (HDDs) and Dibenzofurans (HDFs)", U.S. Environmental Protection Agency, Office of Pesticides and Toxic Substances, EPA 560/5-87/007, September 1987.

2) "Method 1613:Tetra-through Octa-chlorinated dioxins and Furans by Isotope dilution HRGC/HRMS", U.S. Environmental Protection Agency, Office of Water Engineering and Analysis Division, EPA 821-B-94-005, October 1994, Revision B

3) "Method 8290: Analytical Procedures and Quality Assurance for Multimedia Analysis of Polychlorinated Dibenzo-p-dioxins and Dibenzofurans by High Resolution Gas Chromatography/High Resolution Mass Spectrometry", U.S. Environmental Protection Agency, Environmental Monitoring Systems Laboratory, June 1987.

4) "Guidelines for Reporting Test Results of HDD and HDF Determinations in Commercial Products (40 CFR 707 and 766)", U.S. Environmental Protection Agency, Office of Pesticides and Toxic Substances, June 22, 1990

FIGURE 1. REPORTING STRUCTURE BLOCK DIAGRAM



APPENDIX A

CURRICULUM VITAES

Ron Collins
Albaugh, Inc.
Plant Manager, St. Joseph Facility

EDUCATION

Northwest Missouri State University — Maryville, MO
Bachelor of Science: Chemistry — May, 1969

EXPERIENCE

Albaugh, Inc. St. Joseph, MO — Jan. 1992 – Present
Title: Plant Manager
Responsible for all operational areas of this agricultural chemical manufacturing and formulating plant. Includes direct managerial responsibility for production, shipping & receiving, maintenance & engineering, order processing, quality control, and regulatory compliance.

Wilcox Electric Kansas City, MO — Aug. 1990 – Dec. 1991
Business: Manufacturer of Aviation Guidance Systems
Title: Regulatory Affairs Specialist
Responsible for ensuring plant compliance with state and federal environmental and hazardous materials regulations. This included hazardous waste management, right-to-know and RCRA training, environmental health and safety oversight, and hazardous chemicals inventory control.

Agrolinz Inc. St. Joseph, MO — 1983 – 1990

Business: Manufacture and Formulation of Agricultural Chemicals

Title: Laboratory Manager
Responsible for quality control, formulation & process development, and environmental regulatory compliance.

Rhone-Poulenc Inc. St. Joseph, MO — 1974 – 1983
Business: Formulation of Agricultural Chemicals
Title: Laboratory Supervisor
Supervised the quality control laboratory. Responsible for ensuring raw materials and finished products were in compliance with established specifications.

Ron Collins (Continued)

EXPERIENCE (CONTINUED)

The Blueside Company St. Joseph, MO 1970 – 1974
Business: Leather Tanning
Title: Chemist
Performed quality control tests on raw materials and finished products. Purchased raw materials and maintained inventory.

PROFESSIONAL MEMBERSHIPS

American Chemical Society
Board of Directors South St. Joseph Industrial Sewer District

REFERENCES

John Faris
Harcross, Inc.
5200 Speaker Rd.
Kansas City, KS 66106
(913)321-3131

Terry Heath
Witco Corp.
3230 Brookfield
Houston, TX 77045
(618)692-6488

Joe Brennan
Terra International
1000 Terra Road
Blytheville, AR 72316
(501)763-2022

Alice Walker
Alice Walker Consultants
785 Country Club Drive
Senatobia, MS 38668
(601)562-5995

John F. Stadalsky
Blackman Uhler Chemical
Product Development Manager

EDUCATION

Clemson University — Clemson, SC
Bachelor of Science: Chemistry — June, 1975

EXPERIENCE

Blackman Uhler Chemical, Spartanburg, SC — 1980 – Present
Title: Product Development Manager
Coordinate toll and customer manufacturing projects from lab to production. Facilitate transfer of technical information and projects between the Spartanburg location and assist with the Quality Control management at the Augusta location.

Title: Research and Development Chemist — 1987-1989
Coordinated the production of water treatment chemicals, ran development program for water treatment chemicals. Assisted in the development of Textile printing chemicals and dye intermediates.

Title: Research and Development Chemist — 1980-1987
Developed and coordinated dye intermediate production. Developed and scaled-up nitration processes. Established use of online information retrieval and development projects.

Unisphere Chemical, Spartanburg, SC — 1978-1980
Title: VP – Director of Development
Responsible for R&D, QC, and helped manage production.

Milliken Chemicals, Spartanburg, SC — 1975-1978
Title: Senior Development Chemist
Developed and scaled-up ethoxylated and propoxylated products. Designed and oversaw construction of new ethoxylation and research laboratories at the Milliken Research Center. Developed dyeing and finishing auxiliaries.

Title: Development Chemist — 1970-1975
Developed and scaled-up ethoxylated intermediates, fiber finish components and dyeing auxiliaries. Developed line of printing ink dispersants.

John F. Stadalsky (Continued)

PROFESSIONAL MEMBERSHIPS

American Chemical Society – Western Carolina Section

Mark R. Bauer, Ph.D.
Battelle Memorial Institute
Senior Research Scientist

EDUCATION

Denison University Bachelor of Science: Chemistry	Granville, OH 1980
Michigan State University Master of Science: Analytical Chemistry	East Lansing, MI 1983
Michigan State University Ph.D.: Analytical Chemistry	East Lansing, MI 1986

EXPERIENCE

Battelle Memorial Institute, Columbus, OH 1996–Present
Title: Senior Research Scientist

Dr. Bauer is a Senior Research Scientist in Battelle's AgriFoods Market Sector (formerly Agrochemical Product Development). He has led studies involving protocol preparation, field sampling, sample transmittal, sample receipt, sample processing, analytical methods development, sample preparation and analysis, data analysis and evaluation, quality control/quality assurance, and report preparation. In addition, as a Technical Leader within the group, he has been responsible for the technical quality of studies conducted by other researchers.

Dr. Bauer has developed methods for isomer-specific determination of polychlorinated and polybrominated dibenzo-p-dioxins and dibenzofurans in a variety of matrices, including bulk chemicals, flame retardants, resins, and extrusion fumes. The results of some of this research were published in the Journal of Fire Sciences and Bull. Soc. Chim. Belges.

Dr. Bauer's studies have encompassed a variety of analytes, metabolites, and matrices. The analytes have covered various pesticide classes, including herbicides, insecticides, and fungicides. The matrices have included a wide variety of crops, soils, sediments, and waters. He has also conducted studies on a variety of animal tissues and organs. He identified pesticide metabolites using a variety of MS techniques, including EI and CI GC/MS, MS/MS, GC/MS accurate mass, and FAB. He also applied these methods to determine the chemical structures of newly synthesized materials or recently isolated chemical and biological metabolites.

Mark R. Bauer, Ph.D. (Continued)

EXPERIENCE (CONTINUED)

In addition to his study accomplishments, Dr. Bauer has developed new instrumental analysis techniques, including a method for the ultra-trace determination of pyridostigmine bromide in plasma by packed capillary liquid chromatography/continuous flow FAB MS and a method for determining volatile organics in water using a hollow-fiber membrane MS interface. His study results were described in Analytical Chemistry.

Title: Technical Leader 1994-Present
Dr. Bauer also serves as a Technical Leader for Product Characterization, where he is responsible for project leadership and for the technical quality of chemical characterization programs which utilize a wide variety of analytical instrumental techniques to determine physical properties and/or identify and quantitate trace impurities.

Title: Principal Research Scientist 1993-1996

Title: Research Scientist 1987-1993

Michigan State University, East Lansing, MI 1980-1986
Title: Graduate Assistant

Denison University, Granville, OH 1978-1980
Title: Teaching Assistant

PROFESSIONAL MEMBERSHIPS

American Society for Mass Spectrometry
American Chemical Society

Charles D. Lawrie
Battelle Memorial Institute
Supervisor, Quality Assurance

EDUCATION

University of Illinois at Chicago — Chicago, IL
Bachelor of Science: Biological Sciences — 1987

University of Maryland — College Park, MD
Master of Science: Marine, Estuarine, and Environmental Sciences) — 1990

EXPERIENCE

Battelle Memorial Institute, Columbus, OH — 1998–Present
Title: Supervisor, Quality Assurance
Responsible for all quality assurance matters in the Agrochemical Product Development (APD) department. Primary duties to ensure departmental compliance with 40 CFR 160 as they apply to regulated studies. Review studies to ensure compliance with current EPA regulations. Administrate APD department's training program. Assist FDA QAU in periods of high work throughput.

Nestlθ Quality Assurance Laboratory — 1996-1998
Title: Vitamin Chemistry
Responsible for supervising chemical analyses and implementation of additional study teams operating under FDA guidelines. This work specializes in vitamin assays, analysis and reporting of chemical data, methods development, internal and factory laboratory audits, SOP generation, Good Laboratory Practices, Quality Assurance and Quality Control of laboratory data.

Covance Laboratories (Corning Hazleton WI) — 1991-1995
Title: Study Director
Responsible for project supervision of studies of agricultural chemicals for EPA registration under 40 CFR Part 158, Subdivision N, Sections 161-163. These studies elucidate the fate of xenobiotics under various environmental conditions. This work specializes in: pesticide product registration, degradation and transport pathways, analyses and reporting of chemical data, study and workplan design, Good Laboratory Practices (GLP), Quality Assurance and Quality Control of laboratory data.

Charles D. Lawrie (Continued)

EXPERIENCE (CONTINUED)

United States Department of Agriculture 1990-1991
Title: Agricultural and Food Chemist
Responsible for methods development for the extraction, purification and characterization of organic compounds found in various food commodities. This work specialized in advanced analytical instrumentation using FDA and EPA Good Laboratory Practices (21 CFR Part 58 and 40 CFR 160, respectively).

PROFESSIONAL MEMBERSHIPS

American Chemical Society, Agrochemical Division
Society of Quality Assurance